der Meteorologie. Among the high stations Mexico has eight that really belong to high plateau stations, United States had three high plateau stations and two mountain stations, South America has two high plateau stations and three very high mountain stations. In Austria-Hungary we find three high mountain stations, in Great Britain one, in France four, in Germany four, Russia one, Portugal one, Switzerland five. India has two plateau and one mountain station. South Africa has three mountain stations; Australia, New Zealand, and Madagascar have each one.

Most of these are simple observing stations, eight or ten of them are furnished with continuous self-recording apparatus, and a few of them are so elaborately equipped as to be more properly designated observatories of the first class. At most of these stations the diurnal periodicities of the temperature, wind, and cloudiness have been carefully determined, and the comparison with the same periodicities at lower stations has revealed differences that seem to follow regular laws, which, if they continue to hold good for still higher regions and for other portions of the globe, may make us feel that we begin to know something about the ocean of air above us. But have we a right to infer that what holds good for a mile above sea level will also obtain for twenty or fifty miles farther up? That is the problem that is now being solved by the use of kites and balloons. The sounding balloon gives us six items with regard to the atmosphere up to ten or twelve miles, namely, the temperature, moisture, insolation, radiation, direction, and velocity of movement of the air. It could tell us about the pressure at those altitudes if we had any method of measuring the altitude trigonometrically, but thus far this has rarely been possible and the self-recording barometer carried by the sounding balloon is only used as a basis for determining the altitudes. The items given by the sounding balloon are very meager because they only hold good for a few hours on special days, but they are exceedingly welcome as supplementary to the continuous records of mountain stations.

Although thousands of observers have been at work for a hundred years gathering meteorological data yet much of this work has had an amateurish character and only a small portion of it lends itself to the needs of modern investigation. We have now a fairly satisfactory series of maps giving monthly and annual averages of pressure, temperature, winds, and rainfall for the surface of the land and the ocean, but we know less about the upper air than we do about the ocean deeps. So far as we can now see, our knowledge of the conditions and motions of the atmosphere in the midst of the clouds a few miles above our heads (where our storms form, develop, and die) must always depend upon the results of difficult mathematical investigations, checked as to their accuracy by an occasional balloon ascension and the steady records of a few mountain observatories. The conviction of the truth of this general statement has led the leading meteorologists of the world to unite in international work for the maintenance of mountain stations, kite work, balloon work, and for the publication of a series of memoirs embodying the results of their study "on the physics of the free atmosphere or the scientific investigation of the higher strata of air." The last number of the publications of the International Committee for Scientific Aeronautics gives the results of simultaneous observations on April 14, 1904, as obtained by seven sounding balloons, five ordinary balloons, five kite stations, twenty-five mountain or hill stations, and thirty-three stations for the observation of clouds. All of these relate to the atmosphere over Europe, excepting the one record from Blue Hill, Mass. There could not be any more eloquent testimony as to the value of research in the upper air and the thoughtful reader will at once see that up to the present time mountain observatories have formed the fundamental basis for all this work, while kites and balloons have been but auxiliaries. These latter are sent up simultaneously once a month, while the mountain work goes on continuously night and day. All this is research work so-called, looking to the improvement of our knowledge of the atmosphere and therefore of our weather predictions, which latter may for a long time depend wholly upon weather maps representing the conditions near sea level. We must wish success to every movement toward the establishment of mountain stations in the United States. They are doubtless expensive and life therein may be lonesome, but enthusiastic observers and students will always be found to do work worthy of the support of the patrons of science. The mountain peaks of the Coast Range, the Sierras, Rockies, and Appalachians should be crowned with a series of sentinel towers where watch may be kept of every change foreboding storm, or rain, or drought. The astronomers have their hundreds of costly observatories for the study of the sun and the stars, but it is still more important that meteorologists should be furnished with the observatories that are so greatly needed by them.

AN ABSURD EXPLANATION AS TO INDIAN SUMMER.

A writer who signs himself L. M. McC. published in the Chicago Evening Post of October 4, the following paragraph:

> At Indian summer the whirling planet sails into the broad aerial gulf stream, a vapor plane that stretches through space. Its dust fills the atmosphere, its moisture and peculiar qualities for light reflection bring us the hazy days, the mellow sunlight, and that mysterious influence of indolence.

Those who have studied astronomy and physics in the ordinary high school scarcely need to be told that these ideas are purely fanciful and entirely contrary to what is possible in nature. We have not yet been able to prove that meteors or shooting stars or meteoric dusts have anything more than a perfectly inappreciable influence on our atmosphere; they must have some little influence, but they do not produce the Indian summer haze. There is no broad aerial gulf stream for our whirling planet to sail into. There is no vapor plane stretching through space. The dust and moisture that fill our atmosphere rise up from the surface of the earth and produce the haze that we see until clouds and rain wash the air clean again.

THE ALTITUDE OF MOUNT WHITNEY, CAL.

Communicated by H. C. Rizer, Acting Director, U. S. Geological Survey, September 1, 1905.

> The elevation of Mount Whitney, Cal., was determined by the U. S. Geological Survey as being 14,502 feet in August, 1905, by a check line of spirit levels run by Mr. R. A. Farmer, topographer, under the direction of Mr. E. M. Douglass, geographer, from Mount Whitney station on the Southern Pacific Railroad, situated a few miles north of Owens Lake, to the summit of the peak. The initial elevation of Mount Whitney station was accepted as 3691 feet, as derived from a line of precise levels run earlier in the season from Mojave, Cal. The bench mark at Mojave, in turn, is on a line of precise levels based upon a tidal bench mark at San Pedro Harbor near Los Angeles, and checked by connecting with a tidal bench mark of the Coast and Geodetic Survey at Benicia Arsenal on San Pablo Bay, a few miles north of San Francisco. The distance from Mount Whitney station to the summit of Mount Whitney along the line leveled is 23 miles, with a rise of 10,811 feet.

Other determinations of Mount Whitney make its elevation as follows:[1]

Authority. Method.	Feet.
Professor Whitney, by barometer	14,898
Lieutenant Wheeler, by barometer and vertical angles	14,470
Professor Hallock, of Columbia University, New York, by boiling point	14,525
Professor Langley, by barometer	14,522

[1] A discussion of the previous determinations of the altitude of Mount Whitney will be found in the MONTHLY WEATHER REVIEW for November, 1903, pages 524, 527, 533. Professor McAdie's computation of his own observations gave 14,515 feet.—ED.